BCA-SYLLABUS

As per guidelines of the UGC/Patliputra University (Hons.) Paper

Hons. – First Year PAPER – I

Full Marks – 100 **(Theory-75, Practical-25)**

Group- 1 COMPUTER FUNDAMENTALS

Introduction to Computers : What is Computer? Comparison between computer and human brain, Characteristics of computer, Computer applications.

History of Computers : Initial development, Generation of computer, Evolution of Personal Computer.

Computer Organization : Basic Units of computer, Block diagram of computer, Input unit, Processing unit, Output unit, Storage unit.

Types of Printers : Hard copy output, Impact printers, Non-impact printers, Serial and line printers, Dot-Matrix printers, Laser printers, Daisy wheel printers, Drum and chain Printers, Thermal printers. External storage devices : SASD, DASD, Punch cards, Magnetic Tapes, Blocking utilization factor, Magnetic Disk, Tracks, Sectors, Seek time, Rotational latency, Access time, Numerical problems. **Types of Computers :** Digital, Analog, Hybrid Computers, General purpose Computers, Turnkey Systems, Micro computers, Mini computers, Mainframes, Super Computers.

Data Representation : Number Systems, Binary system, Binary to Decimal and Decimal to Binary conversion. Binary addition, 2's compliment representation, Binary subtraction, ASCII and EBCDIC coding.

Computer Software : Machine language, Assembly language, High level languages, Compilers, Interpreters, Assemblers. Centralized processing, Decentralized processing, Distributed processing, Management Information System.

Processing Modes : Uniprocessor, Multiprocessor, Batch processing, off line data entry, On-line processing, On-line data entry, real Time processing, Time sharing processing, Electronic mail, Tele text, Tele conferencing.

Programming Concepts : Programme definition, Characteristics of good programme, Programming steps, algorithms, Flowcharts.

Group-2 INTRODUCTION TO COMPUTER ARCHITECTURE

- Introduction to microprocessors and associated components, Timer, display controllers, DMA controllers.
- Block diagram of IBM PC. Evolution of microprocessor. Family of Intel microprocessor, introduction to 8086 & 8088 architecture.
- Functional description of various modules & cards. CISC & RISC technology. Various types of displays and other peripherals used in IBM PCs.
- Boot process in IBM PC. System files. Self text.

- Disk Operating System – Information, File management. Directory Structure in DOS. Internal and External commands of DOS.
- Batch files, Configuration files. System files, COM, BIN, SYS, EXE & TXT files.

Group – 3 PROGRAMMING LOGIC AND DESIGN TECHNIQUES

- Programme development, low-level programming language, high-level languages, programming aids, programming techniques, Programming tools, Program Maintenance.
- Techniques of programming (Algorithm, flowchart, pseudo codes). Introduction to programming in QBASIC structured Programming – Introduction. Need of structure programming Development of programme in QBASIC.

Group-4

PRACTICAL

- Visit to computer lab : Introduction to various components of a computer. A simple documentation preparation and printing. Usage of printer and other components.
- Use of External and Internal DOS commands. Programming in QBASIC.
- Physical inspection of IBM PC and internal cards. Introduction to nomenclature (COM1,COM2, etc). Writing batch files for various purposes. Modify config.sys files. Creating using QBASIC programmes.

PAPER – II

Full Marks – 100 (Theory-75, Pactical-25) Group – 1 OPERATING SYSTEMS

- Introduction to various categories of software. Operating system and its function interaction of operating system with hardware and user programme.
- Various components of operating system with reference to DOS, BIOS, BIOS and DOS interrupts. Single user operating system, Task loader, Memory management.
- Device management. Control of various devices. Device drivers interrupts driven and pool driven data transfers. Need of software and hardware protocols.
- Multi-user, Multi tasking, multi processing and real time operating system. Introduction to memory management scheduling.
- File systems, File Management. Process management and scheduling.
- Special requirements and facilities for multiprocessing environment.
- Examples of multiprocessing operating systems. Introduction to UNIX. User management in UNIX.
- Computers in office automation: Nature and uses of information, Formal and Informal Information and Communication, Gathering and Presenting Information.
- System life cycle, documentation, testing, debugging, Implementation.

Group-2 BUSINESS APPLICATIONS

- Database organization, Database files, records, fields, types of files in database.
- File organization: Sequential file, Random file, Indexed file, Windows 98/2000, MS-Office.

Group-3

PROGRAMMING WITH FOXPRO FOXPRO: VIEWING AND EDITING DATA

- Fox Pro-version, features, requirements of hardware and software

- FoxPro- Menu system
- Creating database file, operation of data base (create, list, append, close, quit) ❖ FoxPro-data type
- Data displaying and monitoring commands: display, list locate, edit, change, browse, replace, delete, recall, pack (all commands with various options)
- File utilities in FoxPro – display directory, copy delete, rename

FOXPRO : INDEXING, SORTING AND PRINTING REPORT

- Indexing concept and sorting
- Sort commands-single & multiple key
- Advantages and disadvantages of sort
- Indexing vs sorting & multiple key
- Indexing, find, seek rushmore technology
- Foxpro report-its creation, feature & utilities, preview, printing custom report, grouping & sub grouping.
- Foxpro level-designing and printing

FOXPRO : Memory variables. Keyboard Macros and Function

- Memory variables-creation and uses, simple vs array
- Saving and restoring memory variables
- ?/??/??? commands
- Time & date functions and commands, date arithmetic
- Converting defining functions keys

Arithmetic operations, Mathematical functions, mathematical Commands, Statistical Functions

PROGRAMMING AND ERROR DEBUGGING:

- Concept of FoxPro commands file, Modify commands
- Conditioning, branching and looping within Programme file with Do-While Enddo, if-Endif, ScanEndscan, For-Endfor, Docase-Endcase, Tex-Endtext, Executing commands from other command files, Macro Message
- Common Error Message
- Debugging techniques and commands

MULTIPLE DATA FILE AND CUSTOM SCREENS:

- Concept of Multiple Database File, Using multiple database-SET RELATION, UPDATE, APPEND FROM, COPY TO, JOIN, Relation Query by example.
- Concept of Multiple Database File, Using multiple database-SET RELATION, PDATE, APPEND FROM, COPY TO JOIN, Relation Query by example.
- Create custom screen with @, @_GET, @_EDIT, @SAY_GET_READ, Creating Box & Line, User define functions, Custom Screen Designing and their uses, FoxDoc for Documentation ❖ Text & References:
- FOXPRO made Simple:by R.K. Taxali, BPB
- MASTERING FOXPRO 2.5 BPB Publication

Group-4 PRACTICAL

- Development of a batch files to install software from floppy to disk. Development of a batch files to manage various packages on the disk. Detection of viruses and protection packages on IBM PC.MS-OFFICE, WINDOWS 98/2000.

HONS. – Second Year

Paper-III

Full Marks -100 (Theory-75, Practical-25) COMPUTER NETWORKING

- Introduction to the N/W, Network Topologies, Types of channels: Twisted Wire, Co-axial wire, Microwave Communication, Satellite Communication, Optical fiber, Simplex, Duplex, Half Duplex

  Communication, Switching Techniques: Circuit Switching, Message Switching, Packet Switching, FEP, Repeaters, Bridge, Gateway, Token passing CS/CD, Protocols, ISO-OSI Model, NIC, Serial and Parallel Communications.

INTERNET

- Evolution, Protocols, Interface Concept, Internet Vs Intranet, Growth of internet, ISP, Connectivity-Dial-Up, Leased Line, VSAT, etc URLs, Domain Names, Portals, Application
- E-Mail Concept, POP and We Based E-Mail, address, Basics of sending and receiving. E-mail protocols, Mailing list, Free Email services.

BOOLEAN ALGEBRA

- Boolean Algebra, Rules and Theorems, De'Morgan Theorem, Duality Principal, Logical gates, Canonical equations, K-Maps, Half Adder, encoder, decoder.

STRUCTURED PROGRAMMING

- Methods of documentation. Methods of analyzing a program requirement. Data flow diagrams.

C-LANGUAGE Unit-I

- Overview of C
- Introduction & features of C
- Structure of C Program
- Variables, Expressions, Indentifiers, Keywords, Data Types, Constants
- Operators and Expressions
- Operator : Arithmetic, Logical, Relational, Conditional and Bitwise Operator Precedence and Associatively of Operators,
- Type Conversion in Expression

Unit-II

- Basic Input/Output and Library Functions
- Single character input/output, i.e. getch(), getcher(), getcher(), putcher()
- Formatted input/output i.e printf() and scanf()
- Library functions – concepts, Mathematical & Character functions.
- Control Structure

- If statements, If-Else statements, Nesting of If-Else Statements, else if lader
- The?: Operator go to statement Switch statement Compound Statement Loop control for, while, do-while loops break, continue, go to statement

Unit-III

- Single and Multi Dimensional arrays
- Array declaration and initialization of Arrays
- Strings: declaration, initialization, functions.

Unit-IV ❖ Functions, The need and form of C functions, User defined and library functions, Function arguments, Return values and nesting of function, Recursion, Calling of functions, Array as function arguments, Scope and life of variable-local and global variable, Storage class specifierauto, extern, static, register

Unit-V

- Structure and union, Defining structure, Declaration of structure variable, Accessing structure member, nested Structure, Array of Structure, Structure Assignment, Structure as function argument, union

Unit-VI

- Basic of pointers, operators, Pointers and function, passing arrays to function, array pointers, pointers strings, pointers to structure, pointers within structure

Unit-VII

- Dynamic Memory Allocation, the process of memory allocation, malloc () operator, size of () operator, function colloc(), function fee(), function reailoc()

Unit-VIII

- File handing, file Structure, File handing function, file type, Streams, text, Binary, file pointer, opening file and closing file, writing and reading a character, using fogen(), get(), putc(), &fclose(), using feof(), working with string fputs() & fgetsj), flushing stream, using fread(), fwrite(), & rewrite(), direct access file.

Unit-IX

- Preprocessor Directive & Command, the Preprocessor, #define, defining like macros, #error, #include, Conditional Compilation directive i.e, #if, #else, #elif and #ifdef 7 #under #line

Text & References Books

- Pointor Through C.Y.Kanitkar TSR through C.Y.Kanitkar Programimg in CE.Balaguru Swami
- Programming in C language in C language and Project development.

Data Structure

Introduction to data structure

- Concept of data structure
- Abstract data Structure
- Analysis of Algorithm
- The Concept of List
- Stack and Queues
- Introduction to stacks primitive operation on stack
- Stack as an abstract data type
- Multiple stack
- Stack application: infix, postfix, prefix and recursion
- Introduction to queues
- Primitive operation on the queues
- Queues as an abstract data type
- Circular Queue
- Dequeue
- Priority queues
- Priority queues

Linked List

- Introduction to the list of Stack
- The Linked List of Queue
- Header nodes
- Doubly Linked List
- Circular Linked List
- Stack & Queue as a circular linked list
- Applications of Linked List

Trees

- Basic Terminology
- Binary Tree
- The Tree representation as Array & Linked List
- Binary tree representation
- Traversal of Binary tree; In order, Preorder & Post order
- Application of Binary Tree
- Threaded Binary Tree
- B-Tree & Height Balanced tree, representation of B+ & B* trees
- Binary tree representation of trees
- Counting Binary trees **Searching and Sorting**

- Sequential Searching, Binary Search, Insertion Sort, Selection Sort, Quick Sort, Bubble Sort, Radix Sort, Shell Sort, Heap Sort, Comparison of Sorting Methods.

Tables and Graphs

- Hash Table, Collision resolution Technique, Introduction to Graphs, Definition, Terminology

  Directed, Undirected & Weighted, Graph, Representation of Graphs, Graph Traversal-Depth First & Breadth () First Search, Spanning Tree Minimum Spanning Tree, The Basic Greedy Strategy for computing a Algorithm of Kruskal and Prims

Text & References Books

- Fundamentals of Data Structure : By S. Sawhney & Horowith
- Data Structure : R. B. Patel
- Data Structure : Tannenbaum

COMPUTER AIDED DRAFTING

- Introduction to AutoCAD / RoboCAD or similar package. Advanced features of these packages. Drawing plan of a building using AutoCAD etc. Anatysis feature of AutoCAD

PRATICAL

- Design of layout of a building. Design of interior of its rooms. Printing and plotting the prepared drawings.
- Fashion designing through AutoCAD.

Hons. – Third Year PAPER – V

Full Marks – 100 **(Theory -100)**

PROGRAMMING IN VISUAL BASIC

- The Intergrated Development Environment of Visual Basic
- Menu Bar, tool bar, Project Explorer, tool Box, the Properties Window
- The form Designer
- Immediate Window
- Edit View, Run, Debug, Options
- Using the Application Wizard
- Mapping Project
- Concept of VB Project
- Creating the Project
- Opening, renaming and saving the Projects

Elements of the user interface

- Designing the user interface
- Creating forms and code modules
- Aligning
- Running the application
- Programming an application
- Programming the command buttons

- Grouping controls

Visual Development and event-driven programming

- Common Properties
- Methods and common properties

Customizing the Environment

- Editor tab, format tab, general tab, docking environment tab

Introduction to Visual Basic Lang Variable Variable

- Declaring variable type of variable converting V type, user define data type, special values, variable declaration, a variable's scope

Constant

- Arrays, collections, procedures, subroutines, fur arguments, control flow statement and conditional statements, looping statements, iteration

Working with forms

- Loading
- Showing and hiding forms
- Controlling one form within another
- Using form templates
- Menus
- Designing menus
- Programming menu commands
- Using access andshortcut keys
- Mapping menus at runtime
- Mouse conflicts, dragging list items using message boxes and input dialogs
- Using standard modules instead of from modules

Active X Commands

- The text box control
- Basic properties
- Manipulating the control's text
- Text selection
- Search and replace operations
- Capturing key strokes
- List box and combo box controls
- Basic properties
- The list box controls methods, arrows
- Indexing with the list box controls
- Searching as sort list
- The Scroll box and slider control
- Scroll bar control
- Scroll bar control's event
- Dialog Box
- Using the common dialog controls
- Color common dialog box

- Front dialog box
- The filar open and file common dialog box
- Print dialog box
- Help dialog box
- File controls
- The built Active X controls **Component of Visual Basic**
- Classes, instances, objects
- Encapsulation and abstraction
- Derived classes and base classes, classes in Dynamic Binding, creating object, variables forms as a classes
- Creating manipulating runtime controls the object browser
- Object linking and embedding
- Graphics with Visual Basic
- Form, picture box and image box controls sizing image loading and saving images
- Exchanging image through the clipboard
- Coordinate systems, scale properties and methods
- The drawing methods, drawing text, drawing boxes filling
- Drawing curves, manipulating pixels, specifying colors, specifying gradients
- Event driven programming, Multiple document interface (MDI)
- Interface with Visual Basic And Windows API
- Dynamic Link-Libraries
- Programming and interfacing with office

DATABASE MANAGEMENT SYSTEM I

- Categorization of DBMS systems. Network, Hierarchical and Relational database. Application of DBMS system. Entity relationship charts.
- Relational Database Management Systems (RDBMS). Why to use them and where. Data Manipulation Language (DML) and Data Control Language (DCL).
- Security consideration in DBMS, performance improvement in databases.

DATABASE MANAGEMENT SYSTEM II

- Relational Database advance concepts. Introduction to ORACLE / INGRESS or a similar RDBMS on a multi user environment.
- Structured Query Language (SQL). Form design on an advanced RDBMS. Report generation. Query by example (QBE) and Report by form. Accessing RDBMS using management. Security Consideration.

PAPER VI

Full Marks – 100 (Theory – 100) OBJECT ORIENTED PROGRAMMING

- Introduction to object oriented programming & C++
- Objects, Polymorphism, Inheritance, C++ Fundamentals, Classes and Objects, Function overloading, Operator overloading, Constructors & Destructors, Multiple inheritances, Passing objects to functions, Array of objects, Pointers to object, C++ I/O class library, C++ Stream, C++ Predefined Streams, C++ Stream Classes

JAVA PROGRAMMING

Over View of Java Lang

- JAVA Program Structure, tokens, Java virtual machine, constant & variables, data types, declaration of variables, scope of variables, symbolic constants, type casting
- Operators : arithmetic, relational, logical assignment, increment and decrement, conditional , bitwise, special, expression and its evaluation
- Decision making and branching
- If statement, if, else statement, nesting of if.. else statements, else. If ladder, switch ? operator, loops, while, do , for, jumping loops, labeled loops

Classes, object, methods

- Defining class, adding variable and methods, creating object, accessing class members, constructor, methods of overloading, static members, nesting of methods
- Inheritance: extending a class, overriding methods, final variable and methods, final classes, finalize methods, abstract methods and classes, visibility control
- Array, String and vectors
- Array: one dimensional, two dimensional strings, vectors, wrapper classes, defining interfaces, extending interfaces, implementing interfaces, accessing interfaces,
- Multithreaded Programming
- Creating threads, extending the threads class stopping and blocking a thread, life cycle of thread, using thread methods, thread exception, thread priority, synchronization, implementing the runnable interface **Applet programming**
- Local and remote applets, applets vs application writing applets, applets, applets life cycle, creating and executable applets, designing a Web page, applet tag, addling applet to html, running the applet , passing, parameters to, applets, aligning the display.

ADVANCE TOPICS IN COMPUTERS

Introduction to:

- Computer animation, Artificial intelligence. Dedicated computers, ATM. Data encryption Data communication and networking (course to be modified every year to take care of latest development). Visit to a computer industry.

PAPER VII Full Marks – 100 (Project – 100)

- Design of a database for a business application. Design of data entry forms and reports layouts for this databases. Creation of programmes to access and manipulation of the databases.
- Development of a business application in RDBMS. ❖ Creating, merging, deleting tables.
- Project Preparation & Viva-Vove

PAPER VIII

Full Marks – 100 **(Project – 100)**

- Prepare a Project in C++ Programming.
- Project Preparation & Viva-Voce.

Subsidiary FIRST YEAR ENGLISH

- Julius Caesar (William Shakespeare)
- New Polgrave's Treasury (Poetry)
- Love (Gorge Herbert), On His Bindness (John Mittonb), Ode To a Nightingale (John Keats), Arms and the Men (George Gemard Show), A Little Learning (A. Pope), The World Too Much With Us (William Shakespeare), Break Break Break (A. L. Tennyson)

ECONOMICS

- Micro & Macro Economics, Utility analysis Law of Demand, Elasticity of demand, Consumer's Surplus. Lavs of profit, Principles of population, Cost Analysis. Perfact competition & Monopoly & Price determination. National Income, Social Accounting & Principles of distributors. Rent Interest, Wages, Profit Planning, Functions of money 4 Principles of savings cost Waitonconsequence. Causes, Remedies, Commerical & Central Bank : functions, I. M. F & World Bank : Functions, Law of Taxation, Profits, Salaries, Ability & Principles. Causes of Public Expenditure : Consequence & Cases, International Trade, Comparative Coast Principle of International Trade. Free Trade & Production.

HINDI (100 Marks)

MATH

Group A:

- **Set Theory Abstract Algebra :** Notation of sets and Their Algebra, Cartesian Product, Relation and Mapping and Their Classification Equivalence Relation and Partition of Sets, Countable Sets.
- **Abstract Algebra :** Binary Operations, Notions of Group, Sub Group Cyclic Group and Permutation Group Elementary Concepts of Ring, integral domain and field with examples. **Group B :**
- **Matrices and its Algebra Kinds of Matrices :** (Unitary, matrix, Hermitian Matrix) transporse adjoint, Inverse and orthogonal Matrices, Notations of Rank of Matrix.
- **Liner Programming :** Convex sets and their properties LPP Problem and their Graphical Solution, Theory of Simples Methods and Applications.

Group C :

- **Trigonometry and Real analysis :** DeMoivre's theorem and its Applications. Complex arguments and Hyperbolic functions Gregory series.
- **Real Analysis :** Sequence and their convergence Cauchy's General Principle of convergence, Convergence & Divergent series of the Postive terms, comparison test, Cauchy's root test, D'Almbets Test, Alternation series, Continuity and differentiability.

Group D:

- **Co-ordinate Geometry two dimensions :** System of circles, Radical Access, Co-axial Xircles. The Parabola, The ellipse, The Hyperbola, Conics. Analytical.

Group E :

- **Geometry of three dimensions :** Relations and Notations between two straight lines, equations of planes and straight line condition for complantaity of straight lines. The shortest distance between two lines. Sphere.

SECOND YEAR

ENGLISH

- **An Anthology of English Prose :** National Prejudice-Goldsmith, Definition of Gentleman New man, Knowledge and wisdom C. Russel, On being a Bore-R Lynd, does Cultural matter? Foster, The scientific point of view-Haldane, National Education-Gandhi, The Variety and Unity of India

Nehru. Representative Short Stories : The case oa Amontil Ado-Poe, The gift of the Magihenry, Mr. Know ALL-Maugham, The Doll.s Mans field, A Raja Rao Animal Farm-George Orwell, Essay, Grammar (Common error : Idoiomd and phrases, Pair of world tens sequence.

ECONOMICS

- **Planning Types of Planning:** Capialism, Socialism, Mixed Economics Planning. Characteristics of Indian Economics –Poverty Unemployment & Their measures. Population-forms & Development, population policy. Natural Resources – Forest Policy, Energy Policy, AgricultureCause to dawn fall & measures. Land improvement-limitation of ploughing, determination, joint farming, Chakbandi Co-operative farming. Agriculture-credit, co-operative & Commercial Bank,
  Rural bank (NABARD) New scenario of agriculture development green revolution. Industrial

  Policy-1956, 1977, 1980, Large Industry-Iron, Cement Sugar & Jute. Small Scale IndustryNecessity & Problems. Foreign trade forms & Constructive. Indian five year plan special reference in seventh five year plan 9 book: Economic Planning & Indian Economic system: L. M. Ram, Indian Economy : Rudasadatt & Sundaram.

MATHS

- **Differentials Calculus (3 Question) :** Successive Differentiation, Lebinitz's theorem, Taylor's series and maclaurin's series, Partial derivatives Euler's theorem, Indeterminate forms, Equation of Tangents and normals Asymptotes, Formulae of radius Curvanture in different co-ordinates systems, Maxima and Minima of functions of single variable.
- **Integral Calculas (3 Question) :** Indefinite, Intergralm Definite Integral, Properties of Definite Integration, Integration by summation method, Reduction formula. Rectification and quadrature with simple examples, Volume and surface of solid of revolution, Moment of Inertia, Simple use of double and triple intergration and Gamma and Beta Function.
- **Differetial equation (3 Question) :** Differential equation of 1^{st} order and 1^{st} degree. Separation of variables, Homogenous equations of first order and higher degree, Clairaut's form Liner differential equations of second with constant co-efficients, Orthogonol trajectories.
- **Vector analysis (3 Question) :** Classification of Vectors Triple Products. Differentiation of a Vector functions, differentiation of a product of two vectors, Gradient of a sealer, Divergence and curl of a vector in Cartesian co-ordinates.
- **Mechanics (2 Questions) :** Coplaner forces system, Necessary and sufficient condition for equilibrium of a particle, necessary condition for a system a particle to be in equilibrium. Reduction of a general plane force system, Equation of the line Basic concepts of mechanics. Basic Laws of mechanics. Inertial frames of reference, work and energy, principles of liner momentum, angular momentum and energy for a particle, conservation field and potential energy, principle of conservation of energy for a particle. Rectilinear motion: Uniformly accelerated motion (Including connected system) Resistem motion, Harmonic Oscillate damped and force vibrations, Elastic Springs and strings, Hook's law vertical and horizontal vibrations of a particle attached to an elastie string.
- **Motion in a plane (2 Questions) :** Components of velocity and acceleration, Cartesian radial and transverse, Tangential and normal.

Hindi (100 Marks)

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